

WHAT'S NEW AT ISCP

Visit ISCP's "LinkedIn" Group Blog

ISCP has now started a LinkedIn group. LinkedIn is a professional business-oriented social networking site which is free to join (<http://www.linkedin.com/home>). ISCP has created this group as an international forum and blog space to facilitate knowledge sharing and networking for the members of ISCP. All current ISCP members are eligible to join the blog.

Some discussion guidelines for the blog are as follows:

- Technical questions / responses / comments on concrete pavement topics are highly encouraged.
- All questions and responses should be posted in a professional manner.
- Members should avoid republishing information from any past forums.



All current ISCP members are eligible to join the blog.

This group was created specifically for the technical interaction and exchange of information between current ISCP members. A moderator will check for any harmful, threatening, defamatory, vulgar, obscene or libelous comments as this may lead to immediate expulsion from the ISCP group within LinkedIn. Submissions may be edited primarily for length, accuracy, spelling, clarity, or to remove potentially inappropriate text.

Please contact the moderator Jeff Roesler jroesler@illinois.edu if you have any questions about the policies or terms and conditions.

The blog may be reached at the following web address for LinkedIn members:
<http://www.linkedin.com/groups?mostPopular=&gid=3760764>

SCHOLAR NEWS

Two Great Opportunities for Graduate Studies through March 31

MIT – Portugal is co-sponsoring a program that offers graduate studies in "Complex Transport Infrastructure Systems" (MS) and "Transportation Systems" (PhD) for highly capable and motivated students worldwide.

Faculty from MIT (Massachusetts Institute of Technology) along with faculty from the three participating Portuguese Universities participate in this program:



The School of Engineering of the University of Porto
[FEUP - Faculdade de Engenharia da Universidade do Porto](http://www.feup.pt)



The School of Science and Technology of the University of Coimbra
[FCTUC » FCTUC » University of Coimbra](http://www.fctuc.pt)




Instituto Superior Técnico from Lisbon
<http://www.ist.utl.pt/en/>



(continued on next page)

ORGANIZATIONAL MEMBERS:





Courses are taught entirely in English and some scholarships are available for either program. Applications are being accepted for the Master's Course until March 31. More information about the objectives, contents and style of work can be found at <http://www.mitportugal.org/trans>.

Question beyond what is available on the website can be directed to: picado.santos@civil.ist.utl.pt



MITPortugal

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RECENT THESIS ABSTRACTS

OPTIMIZING CONCRETE MIXTURES WITH MINIMUM CEMENT CONTENT FOR PERFORMANCE AND SUSTAINABILITY

Master of Science Thesis December 2010

By: Ms. Ezgi Yurdakul, MSc
Iowa State University, USA

Thesis Advisors: Dr. Halil Ceylan - (Associate Prof. at Iowa State University)
and Dr. Peter Taylor (Associate Director of the National Concrete Pavement Technology Center, USA)

The main purpose of this research is to investigate the minimum cement content required with an appropriate water-to-cement ratio (w/c) to meet given workability, strength, and durability requirements in a concrete pavement; and to reduce carbon dioxide emissions, energy consumption, and costs.

An experimental program was conducted to test 16 concrete mixtures with w/c ranging between 0.35, 0.40, 0.45 and 0.50; and cement content ranging from 400, 500, 600 and 700 lb/yd³ (pcy). The fine aggregate-to-total aggregate ratio was fixed as 0.42 and the void content of combined aggregates was maintained the same for all the mixtures. Slump; setting time; 1, 3 and 28-day compressive strength; 28-day chloride penetration; and 1, 3, and 28-day air permeability were determined.

The test results showed that strength is a function of w/c and independent of cement content after the required cement content is reached, for a given w/c. Workability is a function of w/c and cement content: increasing w/c or cement content improves workability. Setting time is reduced when cement content is increased for a given w/c. Chloride penetration increases as w/c or cement content increases, when one parameter is fixed. Air permeability increases as cement content increases, for a given w/c.

Based on these findings, it is possible to reduce the paste content without sacrificing the desired workability, strength and durability, for a given w/c. When the overall effect of cement content on concrete properties is evaluated, 400 pcy of cement content is not recommended due to its high porosity caused by its low paste content. Furthermore, 700 pcy would also not be appropriate as increasing cement content does not improve the strength, after the required content is reached; and may decrease durability as high cement content both increases air permeability and chloride penetration. Moreover, for a w/c higher than 0.35, cement content of more than 500 pcy adversely affects the concrete performance by decreasing strength (increasing cement content from 500 pcy to 700 pcy approximately reduced the 28-day compressive strength by 15%) and may cause shrinkage related cracking problems.

Therefore, for a given w/c and for the aggregate system used in this study, the range of 500 pcy to 600 pcy is found to be the most appropriate cement content range that provides the desired workability, strength, chloride penetration and air permeability. Mixtures with 500 pcy of cement content did not have a high workability (ranging from 0 in. to 3 in. depending on the w/c), but it may be improved by the addition of supplementary cementitious materials, water-reducing agents or using a different aggregate gradation system.

The given cement content range was compared with the values obtained in accordance with the ACI 211 Report (2002): considering the high cement content range of 650 pcy to 930 pcy provided by the ACI 211 Report (2002) for the same given conditions, the recommended cement content range of 500 pcy to 600 pcy will have more significant impact and benefits on the concrete construction industry regarding the reduction of cement content.

In addition, to make the findings independent of the selected aggregate system, the relationship between paste volume and concrete properties is established. In order to meet the desired workability, strength and durability requirements; the paste volume should be within the range of 160% to 170% of the volume of voids. Exceeding this range will adversely affect the concrete performance by decreasing strength, and increasing chloride penetration and air permeability.

NUMERICAL AND EXPERIMENTAL INVESTIGATIONS OF JOINTED CONCRETE PAVEMENT

Doctor of Philosophy Thesis March 2011

By: Swati Maitra (Roy)

Department of Civil Engineering, Indian Institute of Technology Kharagpur 721 302.

Under the supervisions of: Professor K. Sudhakar Reddy and Professor L. S. Ramachandra
Department of Civil Engineering, Indian Institute of Technology, Kharagpur 721 302.

Cement concrete pavements are being constructed in many new road projects in India as they are considered to be economical especially for the highly trafficked segments of national highways. In the present work, a three-dimensional finite element model has been developed for the analysis of jointed concrete pavement. The FE modeling considers several aspects of analysis and design like slab-foundation interaction, interface behavior between concrete slab and foundation, load transfer at joints by dowel bar and aggregate interlocking mechanisms, effect of temperature variation, nonlinear deformational response of concrete etc. Push-off tests have been conducted in the laboratory on model concrete pavements with different interface conditions (smooth and rough) and on different types of foundations (base and sub-base) to obtain the values of coefficient of friction, which is a parameter for modeling interface condition. The FE model has been validated with the experimental results available in the literature and also from the results of structural evaluation of in-service concrete pavements carried out in the present work using Falling Weight Deflectometer.

Using the validated FE model, some of the current design issues have been examined. The effect of different pavement and joint related parameters on the load transfer characteristics of a doweled joint has been evaluated. The group action of the dowel bar system was also examined and useful relationships have been developed for estimation of the relative load shared by the individual dowel bars. The effect of different interface conditions on critical stresses under individual or combined action of wheel load and temperature differential has been studied. A generalized expression has been proposed for estimating the critical (edge) stress in the slab subjected to the combined action of axle loading and positive temperature gradient. A fatigue performance model has been developed based on fracture mechanics principles for predicting crack propagation within the concrete slab under cyclic loading.

Keywords: Cement concrete pavement, finite element model, interface condition, load transfer, dowel bar, aggregate interlocking, crack propagation, fatigue.

CALL FOR PAPERS DUE:

4th International Conference on Accelerated Pavement Testing (APT 2012) : Call For Papers: March 1 - June 1

We are happy to announce that the 4th International Conference on Accelerated Pavement Testing (APT 2012) will take place in Davis, California, USA, from September 19-21, 2012. The conference provides a forum for participants to address the various aspects and benefits of accelerated pavement testing (APT) from an international perspective. The theme for the conference is Implementation of APT Results. Abstracts are solicited in all areas which touch upon the subject of Accelerated Pavement Testing.

Call for papers: Abstracts (no more than 500 words) will be accepted March 1, 2011 through June 1, 2011. For further details, go to www.ucprc.ucdavis.edu/apt2012/. If you have questions about the conference, please contact David Jones, University of California Pavement Research Center, University of California, Davis: (530) 754-4421 djjones@ucdavis.edu. We look forward to seeing you in 2012!



Conference Co-Chairs -

Imad L. Al-Qadi, *University of Illinois Center for Transportation*

John Harvey, *University of California Pavement Research Center*

Angel Mateos, *CEDEX, Spain*



If you, as an ISCP member, would like to BE A REVIEWER (for abstracts and papers for various conferences; and for technical publications), please contact Bryan Perrie at: bryan@cnci.org.za or fill out the review panel form online:

<https://spreadsheets.google.com/viewform?formkey=dFQ0am55MGVIYmstRklkV0k0b2o4ZGc6MQ>

Any questions can be directed to editorial@concretepavements.org

Call for Papers DEADLINES:

MARCH 1 through JUNE 1, 2011: CALL FOR PAPERS for the 4th International Conference on Accelerated Pavement Testing (APT 2012) to be held in Davis, California, USA, September 19-21, 2012.

MARCH 31, 2011: SUBMIT PAPERS for the 2nd International Conference on Best Practices for Concrete Pavements held in Florianópolis, Brazil, November 2nd - 4th, 2011

MARCH, 2011: ABSTRACT SUBMISSIONS for the 7th RILEM Conference on Cracking in Pavements, in Delft, the Netherlands, June 20-22, 2012.

APRIL 30, 2011: CALL FOR ABSTRACTS for the 10th International Conference on Concrete Pavements, Quebec, Canada, July 8-12, 2012.

UPCOMING EVENTS CALENDAR

APRIL
2011



International Conference on Concrete Pavement Design, Construction & Rehabilitation
April 18-20, 2011 in Xi'an, Shaanxi Province, P.R. China
http://www.concretepavements.org/China_2011_cfp.pdf
<http://pavement.chd.edu.cn/iccpdcr>

JULY
2011

10th International Conference on Low-Volume Roads
July 24-27, 2011 in Lake Buena Vista, Florida, USA
<http://www.trb.org/conferences/2011/10LVR>

AUGUST
2011

7th International Conference on Road & Airfield Pavement Technology
August 3-5, 2011 in Bangkok, Thailand
<http://www.icpt2011.org/>

2011 International Concrete Sustainability Conference

August 9-11, 2011, in Boston, Massachusetts, USA.
Co-hosted by the Massachusetts Institute of Technology.
<http://www.sustainabilityconf.org/> or contact Lionel Lemay, Lemay@nrmca.org, 847-918-7101.

SEPTEMBER
2011

24th World Road Congress
September 26-30, 2011 in Mexico City, Mexico
<http://www.aipcrmexico2011.org>

NOVEMBER
2011



2nd Conference on Best Practices for Concrete Pavements
November 2-4, 2011 in Florianopolis, Santa Catarina State, Brazil
http://www.ibracon.org.br/eventos/2nd_pavement/informacoes.asp

8th International Conference on Managing Pavement Assets
November 15-19, 2011 in Santiago, Chile <http://www.icmpa2011.cl/>

JUNE
2012

International Congress on Durability of Concrete
June 18-21, 2012 in Trondheim, Norway
<http://www.icdc2012.com>

7th RILEM Conference on Cracking in Pavements
June 20-22, 2012 in Delft, the Netherlands
<http://www.rilem2012.org>

JULY
2012



10th International Conference on Concrete Pavements
Organized by ISCP
July 8-12, 2012 in Quebec City, Canada <http://www.concretepavements.org/10thiccp>

SEPTEMBER
2012

4th International Conference on Accelerated Pavement Testing (APT 2012)
September 2012 in Davis, California, USA
<http://ucprc.ucdavis.edu/APT2012>

OCTOBER
2012

10th International Conference on Superplasticizers & Other Chemical Admixtures in Concrete
October 2012 in Prague, Czech Republic
<http://www.intconference.org/>

12th International Conference on Recent Advances in Concrete Technology & Sustainability Issues
October 2012 in Prague, Czech Republic
<http://www.intconference.org/>

Please visit the ISCP calendar at: <http://www.concretepavements.org/calendar.htm>



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for contributions to this issue and invites ISCP members and friends
to submit articles and calendar items to the Editor-in-Chief for future issues.

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Please visit the ISCP website at www.concretepavements.org for more information about ISCP.

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